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FACTORS THAT AFFECT THE SINGLE-FAMILY HOME MARKET FOR WOOD WINDOWS

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FACTORS THAT AFFECT THE SINGLE-FAMILY HOME MARKET FOR WOOD WINDOWS

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HIGHLIGHTS

- About half the windows used in new single-family homes are wood, but this varied widely among cities, depending on geographical location.
- Maintenance requirements and performance characteristics account for much of the geographical differences in the use of wood windows.
- Builder is the principal decision maker in selecting windows used, but home buyers and suppliers influence his choice.
- Style and architecture of the home determine the type of windows used, but not the material.
- Appearance of wood windows is a major factor favoring their use.
- The cost for wood windows is higher than that for aluminum windows and wood windows are used more extensively in higher priced homes.
- Market outlook for wood windows depends upon such factors as trends in price and design of homes, reduced maintenance for wood windows, and relative costs of aluminum and wood windows.

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INTRODUCTION

Millwork products represent one of the volume uses for the Nation's timber resources, particularly soft-textured softwoods. In 1960 the millwork industry used over 1.5 billion board feet of lumber, of which 46 percent was ponderosa pine and 10 percent other softwoods, such as white pine, cedar, sugar pine, and redwood. Besides utilizing some of the more valuable species and grades of softwood lumber, this industry generates considerable income and employment since multifaceted assembling, shaping, and marketing activities are involved in the production and distribution of most millwork products. In 1963, the value of millwork products was $1.3 billion, an increase of 21 percent over 1958.

An appraisal of the market outlook for these products is vital to planning for both the industry and for managers of timber resources. The harvest of old-growth timber and the regulation of species and wood quality in young stands to meet the demand for wood suitable for millwork can best be accomplished when expected market trends are defined accurately. To do this, it's necessary to make product surveys of various segments of the construction market in which the millwork industry competes --doors, exterior siding, cabinets, windows, etc. This report presents the results of one such survey--the current use of wood windows in new single-family dwellings.

Wood windows account for over 10 percent of the value of millwork products. Between 1958 and 1963, the value of shipments of wood windows increased only slightly, whereas the actual number of wood windows sold declined. Before World War II, most of the windows used in residential construction were wood, but during the 1950's aluminum windows captured a large part of the market. Recently, this trend has apparently reversed, for the use of wood windows is increasing, at least in some segments of the market.

Although no comprehensive data are available, studies and estimates indicate that wood windows probably comprise about 50 to 60 percent of the windows currently being installed in new single-family homes, which account for a large segment of the total market for wood windows. It should be borne in mind that demand in other segments of this market--such as apartments and light commercial buildings--may be significantly different from demand in the single-family home market.

This study pertains only to windows used in 7,920 single-family homes built either in 1965 or 1966, depending upon which year the builder was interviewed. The 92 builders interviewed were all located in 20 cities that were chosen at random from metropolitan areas with populations over 100,000.

The specific objectives of the study were to

1. Determine wood windows' share of the market and identify geographic and other variations in their use.

2. Determine the relative importance of the homebuilder, home buyer, and the supplier in selection of windows.

3. Identify and evaluate the importance of influences on choice of windows, such as

   - Maintenance requirements and other performance characteristics
   - Appearance
   - Availability and suppliers' services
   - Style and price of home
   - Costs
   - Home buyers' preferences

4. Determine the degree to which wood windows meet the more important market requirements, and what changes in manufacturing or distribution are needed.

5. Appraise the market outlook for wood windows.

VARIATIONS IN USE OF ALUMINUM AND WOOD WINDOWS

About 48 percent of all windows used by builders in this study were wood; the remaining were aluminum.[1] The use of wood windows varies geographically, however, as shown in figure 1. Wood windows predominate in cities in the North and East and were used least in cities in the South and West.

Builders don't necessarily limit their use of windows in a house to one material. In 15 percent of the houses, for example, builders used both--usually wood windows on the front of the house and aluminum on the sides and the rear. In 40 percent of the houses, wood windows were used primarily; that is, all or nearly all of the windows in the house were wood. In the remaining 45 percent, aluminum windows were used primarily.

The use of wood windows also varies with the sale price of the house. Table 1 shows that wood windows were used primarily in only 21 percent of the houses priced under $20,000, compared to 57 percent in homes priced over $30,000. The difference in wood window use between price classes was greatest in cities where neither wood or aluminum predominate; that is, where 25 to 75 percent of all windows used were wood.

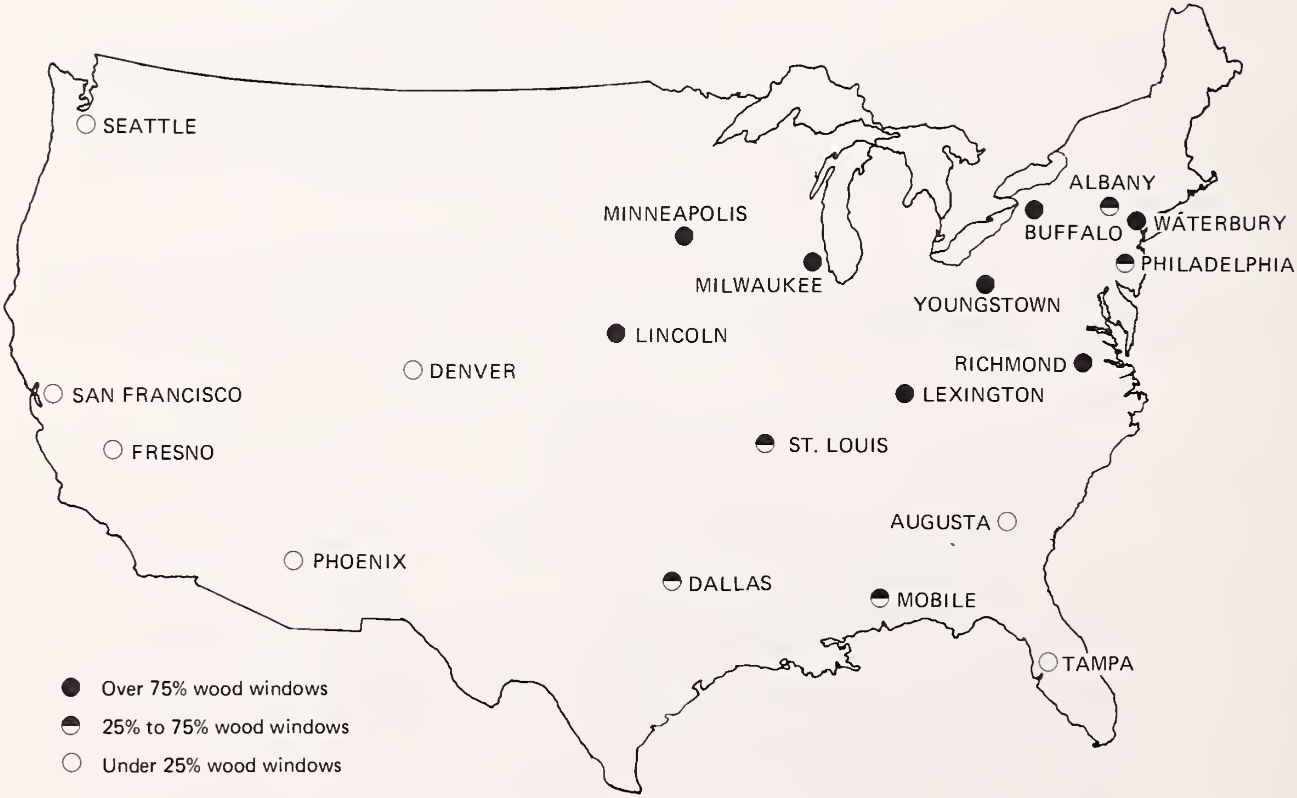

Figure 1.--Window material used in new single-family houses in sample cities.

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[1] Based on the percent of wood and aluminum windows used by each builder weighted by the number of houses he built.

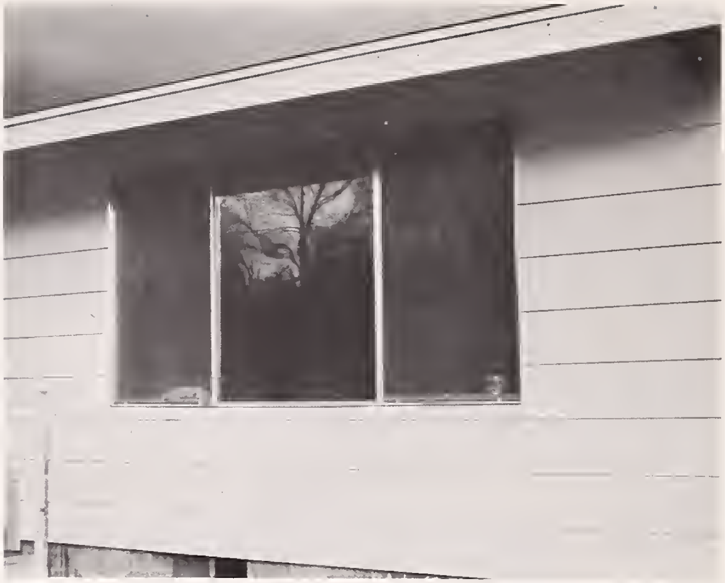
Table 1.--Window material used by sale price of the house
(Percent of houses)

Primary[1] window material in house	Sale price class of house			
	Under $20,000	$20,000-$30,000	Over $30,000	All price classes
Cities where over 75% of all windows were wood[2]				
Wood	86	100	100	97
Aluminum	14	--	--	3
Both	--	--	--	--
Cities where 25% to 75% of all windows were wood[2]				
Wood	6	40	89	36
Aluminum	60	23	--	31
Both	34	37	11	33
Cities where less than 25% of all windows were wood[2]				
Wood	5	6	5	6
Aluminum	95	89	93	91
Both	--	5	2	3
All cities				
Wood	21	46	57	40
Aluminum	64	37	38	45
Both	15	17	5	15

[1] Wood = all or nearly all windows in the house were wood; aluminum = all or nearly all windows in the house were aluminum; both = both wood windows and aluminum windows used.

[2] See map, figure 1, for cities sampled.

Figure 2.--In moderately priced homes such as this one under construction, aluminum windows are often favored because their installed cost is low and they need no painting.



FACTORS THAT DETERMINE BUILDERS' CHOICE

Builders take into account not one but several factors when selecting windows to use in their houses. These vary in importance among individual builders as shown in the following tabulation.

Factor	Most important (Percent)	Second most important (Percent)	Third most important (Percent)
Appearance and architectural style	32	4	15
Purchase price of window unit	21	19	8
Home buyers' preferences	15	12	7
Performance	9	19	16
Price of house	8	12	4
Maintenance requirements	5	14	16
Installation and finishing cost	5	8	7
Availability and supply services	1	3	4
Other	4	5	5

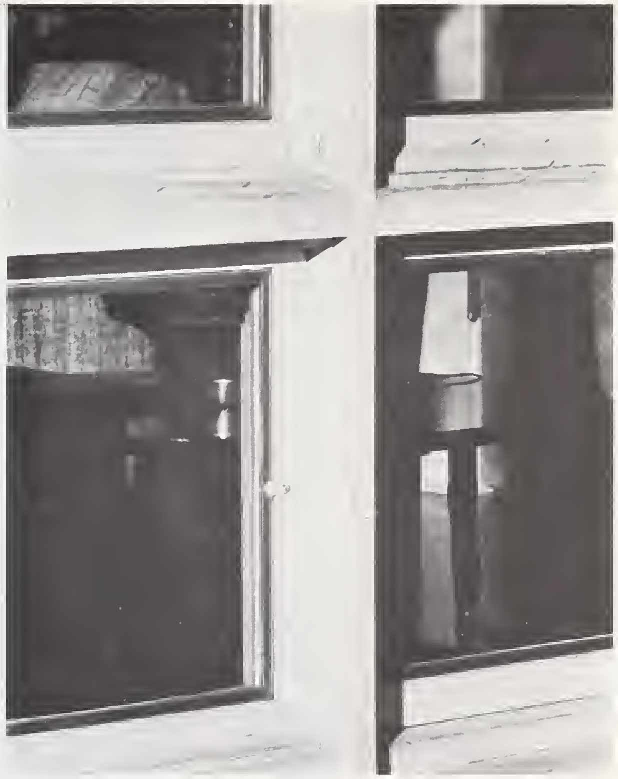


Figure 3.--Wood windows require proper paint maintenance. Windows in this 9-year-old house had not been repainted since installing, and the paint is now weathered and peeling.

MAINTENANCE AND PERFORMANCE

Much of the geographic variation in wood window use can probably be attributed to the maintenance requirements and performance characteristics of wood windows compared to those of aluminum windows.

Maintenance requirements is a chief factor favoring aluminum windows. In cities where aluminum windows predominate--less than 25 percent wood windows--many builders commented that aluminum is "maintenance free" or that "wood windows need frequent repainting." These comments were made most frequently in hot, dry areas of the West. In cities in other areas, such comments were fewer, although some favored aluminum because of the "no repainting" feature, while others favored wood, claiming wood windows were easier to repair and adjust. The comments on window maintenance are summarized in figure 5.

Wood windows are favored because of their insulating qualities and for being condensationfree, particularly in cities where wood predominates and in cities where neither wood nor aluminum predominate (fig. 6). Typical comments from builders in these cities were that wood windows are "warmer" or "condensationfree" or that aluminum windows "are cold," "weep," or "frost up." These factors are apparently less important to builders in warmer areas, as only a few builders in cities where aluminum predominates commented on insulation and condensation.

Builders also commented on proper fit and ease of operation (fig. 7). Some builders feel that it is the quality of the window and the weather stripping used rather than the window material that determines fit and operation. This may account for the

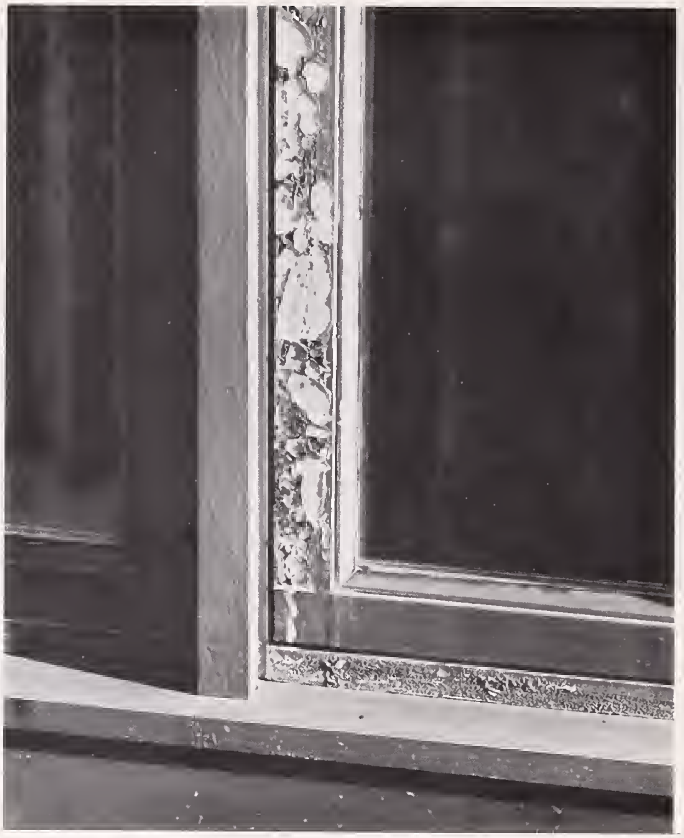


Figure 4.--Excessive pitch in the wood from which this window was manufactured caused this problem on a 3-year-old house. Note that paint on adjacent window sash is in good condition.

fact that opinions were about equally divided as to wood or aluminum having the advantage in fit and operation. Some builders felt that wood windows fit better; other builders that large-size aluminum sliders tend to stick because they are not as stout as wood. On the other hand, some reported that wood windows stick during humid weather and fit too loosely during dry spells. In western cities, builders' concern is over dust leakage, whereas in northern cities it centers on cold air leakage during the winter.

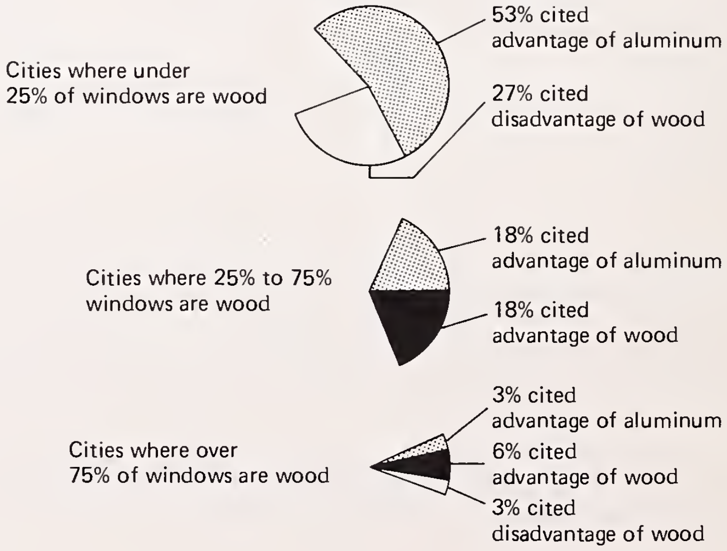


Figure 5.--Builders' comments concerning maintenance.

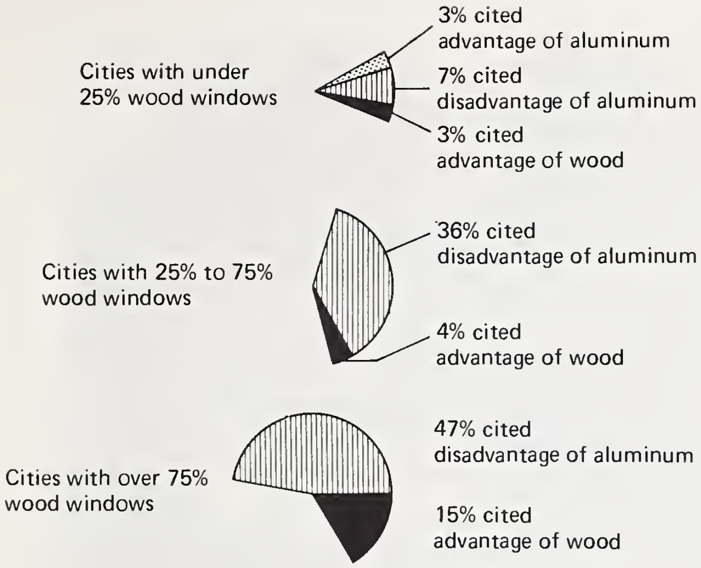


Figure 6.--Builders' comments concerning insulation and condensation.

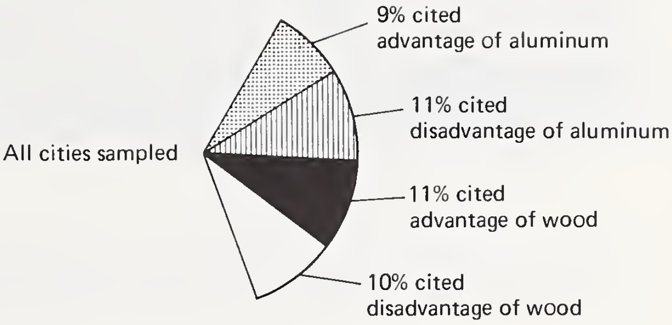


Figure 7.--Builders' comments concerning proper fit and ease of operation.

APPEARANCE AND ARCHITECTURAL STYLE

Style of the house is a primary consideration to builders in choosing types of windows--double hung, awning, etc. (table 2). However, since most of these window types are available in either wood or aluminum, house style does not directly determine whether wood or aluminum will be used. Double-hung or single-hung windows are used most often in traditional (colonial, provincial, etc.), ranch, and rustic homes. Awning, casement, or sliders are most common in contemporary houses. No attempt was made to determine how many houses of each style were built.

Table 2.--Type windows used in different style houses by builders sampled

(Percent of builders)

Type window	Traditional	Ranch and rustic	Contemporary
Double hung or single hung	92	56	14
Awning or casement	4	33	59
Slider	--	11	22
Fixed	4	--	5

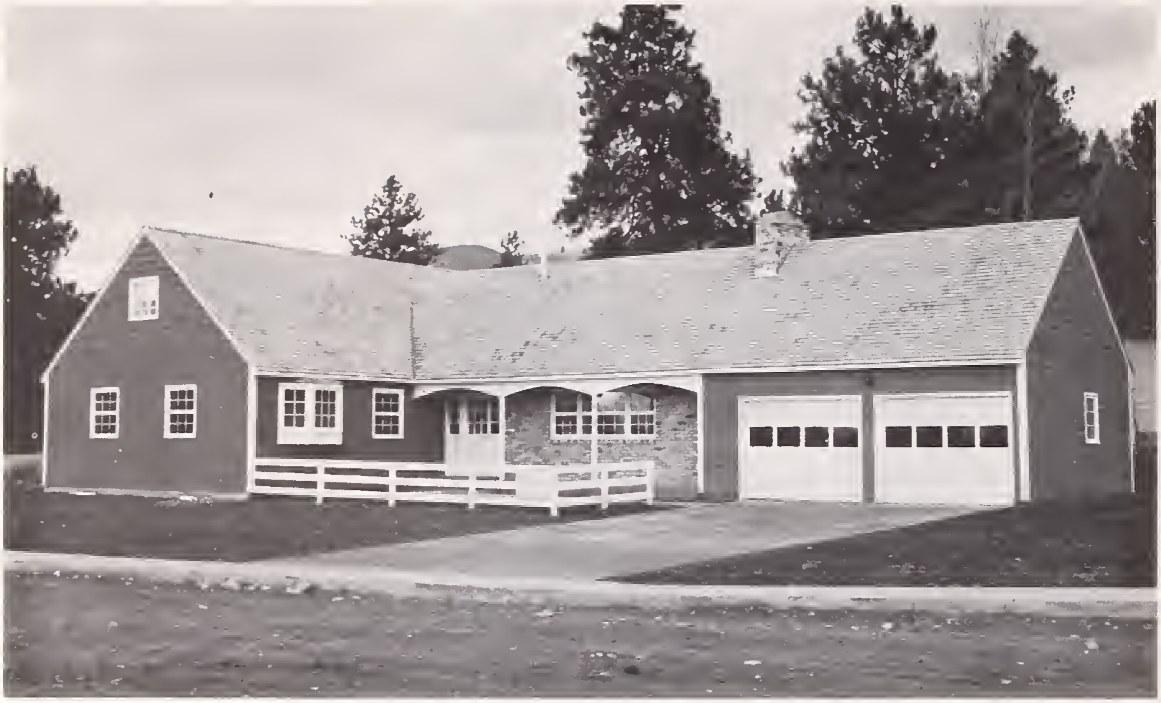


Figure 8.--Double-hung wood windows are favored in traditional style houses such as this one, called "the Farmhouse."

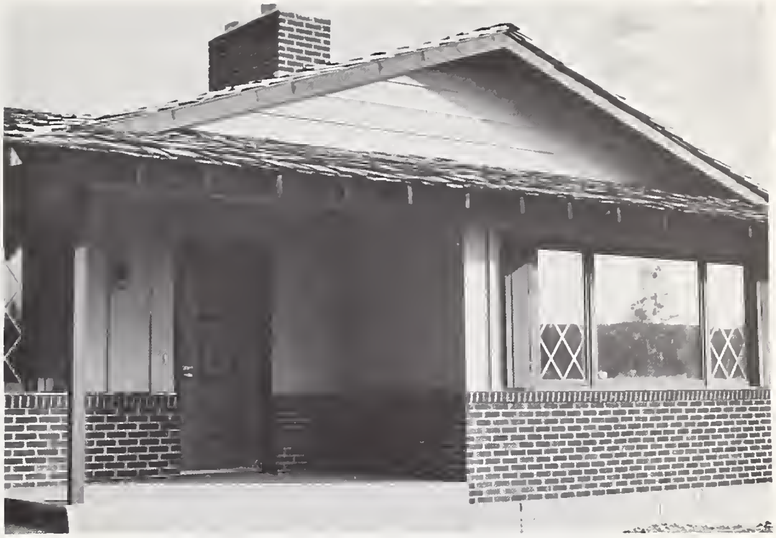
Although style of house does not directly determine window material, some builders favor wood windows for creating an "authentic" effect in traditional and rustic-style houses. About one-fourth of the builders commented that wood had good appearance or that aluminum lacked good appearance; most of these were in northern and eastern cities. However, in western cities, a few builders who used wood windows indicated they did so primarily because of appearance. One builder who used aluminum windows with a baked-on white finish felt these had good appearance because "they look like wood."

BUYERS' INFLUENCE

Builders know what type windows are preferred in their markets and usually plan accordingly. Buyers are frequently given some options in windows to be installed, but most builders indicate that buyers either "go along" with the windows shown in the model home or plans, or they ask the builder for advice. The builder thus can steer the buyer to the window he prefers. The options offered by builders are:

	Percent of builders
Option of both type and material	35
Option of any type of wood windows	10
Option of any type of aluminum windows	4
Options in glazing, hardware, etc., but not type or material	2

Figure 9.--Windows are used to enhance the style, appearance, and sales appeal of the house. This wood window has a fixed center sash flanked by casements sash with diamond-pattern grilles.



About one-third of all the builders offer buyers the choice of either wood or aluminum windows. In cities where aluminum windows predominate, wood windows are usually offered at extra cost, or are limited to higher priced homes. Several builders in cities where wood windows predominate indicated that they charge extra for aluminum windows; furthermore some told buyers that they would not be responsible for the performance of aluminum windows.

About one-third of builders feature windows in their sales promotions. Another one-third indicate that even though they don't specifically base their sales "pitch" on windows, they are careful to use windows that create a good impression and are accepted in the market area.

In their selling, builders stress the strong points of the windows they use. Builders using wood windows stress insulation, appearance, and quality (including brand); builders using aluminum windows stress low maintenance, and a few builders stress convenience features, such as insulating glass (no need for storm sash) and snap-out grilles (easy cleaning).

COSTS

About two-thirds of the builders indicated that window costs--either purchase price or installed and finished costs--are highly important. To some extent, this is reflected in type of windows used: aluminum units, which generally cost less than wood, are used more extensively in lower priced homes where costs are often more critical. However, this doesn't mean that builders are using the lowest cost windows available.

The average costs for window units is shown in table 3. The size and quality of windows used varied among builders, but costs were made as comparable as possible by not including combination windows, or storm sash, screen, insulated glass, and similar accessories. Costs for cleanup and callbacks are also excluded because these were reported by too few builders to derive meaningful averages.

The costs of labor (installation and finishing) varied widely among individual builders even within the same city. In part this is because of differences in cost accounting and allocation procedures. A more detailed analysis might alter these figures. However, these averages are useful to the extent they indicate what builders think their costs are, which is significant from the standpoint of decisionmaking and opinions on window costs.

Table 3.--Average cost of windows by type of window used by builders in single-family houses

Item	Wood double hung	Wood casement, awning, and hopper	Aluminum single hung, double hung	Aluminum glider	Aluminum casement, awning, and hopper
	Dollars				
Purchase price[1] (unit and trim)	22.96	35.97	19.54	20.09	21.50
Installation (unit and trim)	5.46	3.90	3.45	3.50	3.00
Painting	6.68	2.00	--	--	--
Total installed cost	35.10	41.87	22.99	23.59	24.50
Number of builders[2]	43	8	14	17	5

[1] Does not include storm, screen, or similar accessories.

[2] Indicates number of builders who cited their most commonly used window unit. Some of these did not provide complete cost information for the unit.

Purchase price.--The purchase price of double-hung wood windows averages about 15 percent higher than that of similar aluminum windows. In some other window types, the price differential is greater. The difference in purchase price does not appear to influence most builders' choice of material, however. Over one-third of the builders cited the price advantage of aluminum windows over wood, but less than 10 percent used aluminum windows in areas where wood windows predominate.

Installation and finishing.--The cost of installing wood windows is somewhat higher than that for aluminum. Installing the trim on wood windows accounts for as much as half the total installation cost. This accounts for much of the cost difference between aluminum and wood windows since trim is not usually used with aluminum. Aside from trim, there is apparently little difference in installation. Some builders feel aluminum windows can be installed faster than wood windows. However, other builders feel aluminum windows are more prone to damage during construction (glass breakage and bent frames).

Finishing accounts for almost 20 percent of the total installed cost for wood double-hung windows. The cost of finishing is considerably less for other types of wood windows because they do not usually have grilles (bars or muntins) as do most double-hung windows.

Preprimed wood units.--Builders' opinions on preprimed wood units vary. The chief advantage cited is the protection provided by prepriming during construction. The chief complaints are that prepriming is of poor quality--either too thin or too chalky--and that painters would not assume responsibility for paint on preprimed units. Comments made by builders were:

Figure 10.--Some builders prefer preprimed windows such as this one because the prime coat protects the window during construction.

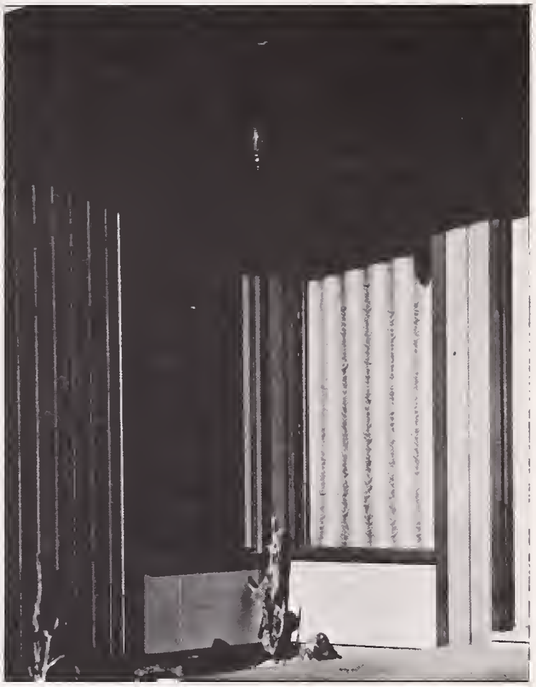
	Percent of builders
Prepriming protects during construction	15
Preprime of poor quality	8
Prepriming does not allow natural or stained finish	4
Prepriming does reduce overall costs	2
Prepriming does not reduce overall costs	2

AVAILABILITY AND SUPPLY SERVICES

The choice of supplier for windows appears to be largely a matter of individual preference, as the supply source used does not appear to be related to the size of the builder's operation or his geographic location. The following tabulation shows supply sources for windows.

Source	Wood windows (Percent)	Aluminum windows (Percent)
Millwork shop	52	4
Manufacturer	26	63
Retail lumber dealer	9	3
Wholesaler	2	15
Jobber	9	11
Other	2	4

Figure 11.--These fixed windows were custom built at a local millwork shop to fit the specific size and style needs of the house. The sash on the right has patterned glass that admits diffused light.



Good delivery service, discounts, credit arrangements, and technical services are all part of the supply package builders expect and get from their suppliers. Most builders purchase their windows from a single supplier and to this extent their choice of windows is influenced by the brands and types he carries.

About 10 percent of the builders complained that there is a long delay when ordering stock wood windows. This requires that builders order their windows well ahead of time (in some cases 30 days or more). Others complained that their supplier did not carry a complete stock of sizes in the brand and type of window they wanted, and several others said that they could not depend on getting preprimed wood windows. These few comments were random and included all geographic areas, large and small builders, and several different types of suppliers.

About one in four builders used some custom-made windows in their homes. Most of these were custom arrangements of standard windows (fig. 12). Generally the builder's regular supplier assembled these custom windows.

Figure 12.--Builders who used custom-made windows.

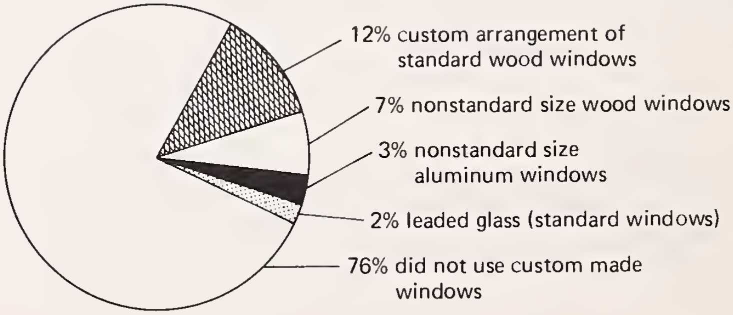
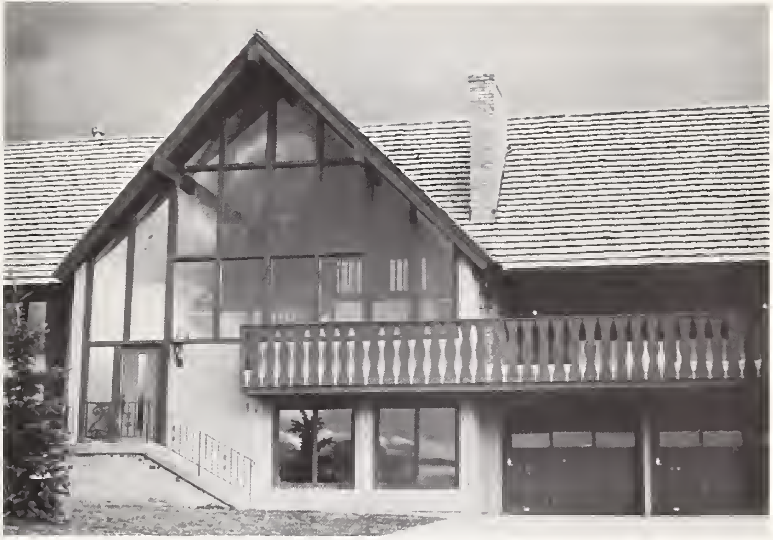


Figure 13.--A growing market for luxury homes such as this one is favorable to wood window use. Some designs use fixed windows extensively; the portion of the house shown has only two operating window sash.



MARKET OUTLOOK

Current trends in the home construction market could result in builders making basic changes in their window-buying policies in the immediate future; specifically (1) the continued increase in the installation of air conditioning in single-family homes; and (2) the expected growth of the "luxury home" market.[2] In fact, over 20 percent of the builders contacted reported having made such changes in the 2-year period prior to being interviewed. Some, admittedly, involved merely changing brands or suppliers, but many involved window material and type or both.

Several builders reported they had begun buying more wood windows or were anticipating doing so because of the increased demand for higher priced homes (in 1965, one out of eight houses built was priced over $37,500[2]). As pointed out earlier, wood windows are in demand in higher priced houses.

The "better insulation" and "less condensation" advantages of wood windows tie in with the trend toward air conditioning, some builders noted. However, this might be offset by the fact that air conditioning permits the greater use of fixed windows and reduces the need for operating windows, which could alter future market demands both in terms of number of windows used as well as style of windows. In fact, 5 percent of the builders interviewed anticipate that they will be installing not only fewer operating windows but a fewer number of total windows in their houses as the more advanced new home designs win greater market approval.

The growing application of the "baked-on finish" by the fabricators of aluminum products poses a formidable threat to the wood window manufacturers' hopes to retain their selling advantage from the standpoint of "appearance." Similarly, these window manufacturers are designing greater "insulating" qualities in their products. In the face of these developments, it appears that wood window producers are confronted with the problem of improving the "maintenance" qualities of their products and, at the same time, reducing the installed costs. Relative cost is certain to have a greater weight in window buying decisions as differences in appearance and performance features are diminished.

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[2] Practical Builder 31(11) "The Luxury Market" Cahners Publishing Co. November 1966.

Benson, Robert E.
1968. Factors that affect the single-family home market for wood windows. U.S. Dep. Agr., Forest Serv., Intermountain Forest and Range Exp. Sta., Ogden, Utah 84401. 13 pp., illus. (U.S. D.A. Forest Serv. Research Paper INT-55)

A survey of builders in 20 cities throughout the Nation shows wide geographical variations in window materials used in new single-family homes. Appearance, style, price, and performance influence choice and thus contribute to these variations. Current trends in the new single-family home market, improvements in window materials, and relative prices of aluminum and wood windows are key factors in the market outlook for wood windows.

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- Logan, Utah (in cooperation with Utah State University)
- Missoula, Montana (in cooperation with University of Montana)
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